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09/926,600	11/26/2001	Kenji Abiko	P 21273	6604

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EXAMINER	
WILKINS III, HARRY D	

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 12232003

Application Number: 09/926,600
Filing Date: November 26, 2001
Appellant(s): ABIKO, KENJI

MAILED
JAN 06 2004
GROUP 1700

Bruce Bernstein
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 4 November 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-6 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

EP 0597129 A1	Fujisawa et al	5-1994

JP 07-278718 A	Shida et al	10-1995
JP 08-225899 A	Abiko	9-1996

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

- Claims 1, 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujisawa et al (EP 597,129).

Fujisawa et al teach the invention substantially as claimed. Fujisawa et al teach (see abstract) an Fe-Cr alloy containing up to 60 wt% Cr, where the total content of C, N, O, P and S are limited to 100 ppm or less. Fujisawa et al describe (see page 35 in Table 1 (1)) that the contents of: C+N are typically below 40 ppm, with several examples (5, 6 and 11) falling below 20 ppm; O is typically below 30 ppm (the O as an oxide must be less than this value); and, S is typically below 20 ppm.

Fujisawa et al fail to meet the claimed "Cr: exceeding 60 wt%". However, the claimed composition range of Cr would have been obvious to one of ordinary skill in the art because the prior art range is close enough, e.g.- 60 wt% vs. 60.0001 wt% that it would have been expected to have the same properties, see MPEP 2144.05.

Regarding claims 3 and 4, because the alloy of Fujisawa et al is nearly identical in composition, particularly in terms of the impurities C, N, O and S, one of ordinary skill in the art would have expected the alloy of Fujisawa et al to have the same strength-ductility balance as claimed.

- Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shida et al (JP 07-278718) in view of Abiko (JP 08-225899).

Shida et al teach (see English abstract) a Cr-Fe alloy that contains at least 70% Cr (by weight, see Table 1, page 4) with reduced N and O impurities.

However, Shida et al do not teach limiting C+N to less than 20 ppm, S to less than 20 ppm and O to less than 100 ppm, with O as oxides at less than 50 ppm.

Abiko teaches (see English abstract) a method of making an alloy that produces very low amounts of gaseous impurities. Abiko teaches (see paragraph 9) that Cgi is the total quantity of the gas constituents in weight ppm. Abiko teaches (see paragraph 17) that the gas constituents are C, N, S and O. Abiko teaches (see Table 1) several Fe-Cr alloys that have Cgi (5^{th} column) of 9.1 ppm, 15.0 ppm and 18.5 ppm. Therefore, one of ordinary skill in the art would have expected the method of Abiko to reduce the amount of C, N, S and O to below 20 ppm total (thus, meeting each of the ranges for C+N, S and O as claimed). Abiko teaches (see English abstract) that the plastic workability of alloys can be improved by the reduction of Cgi.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the method of making taught by Abiko to the alloy of Shida et al because Abiko teaches that the reduced Cgi improves the workability of Fe-Cr alloys. The method of making produces the lowered amounts of C, N, S and O in the Fe-Cr alloys, thus allowing the alloy of Shida et al to meet the present compositional claim limitations.

Regarding claim 2, Shida et al teaches an alloy with at least 70 wt% Cr.

Regarding claims 3, 4, 5 and 6, because the alloy of Shida et al in view of Abiko is identical in composition, particularly in terms of the impurities C, N, O and S, one of

ordinary skill in the art would have expected the alloy of Shida et al in view of Abiko to have the same strength-ductility balance as claimed.

(11) Response to Argument

Appellant's arguments filed 4 November 2003 have been fully considered but they are not persuasive. Appellant has argued that:

a. Fujisawa teaches away from claims 1, 3 and 4 by limiting total Cr to at most 60 wt%;

b. Fujisawa teaches additional elements must be present;

c. Fujisawa only teaches "high-temperature strength", not "super-high-temperature strength";

d. The combination of Shida with Abiko is impermissible;

e. Abiko teaches additional elements should be present;

f. The rejection is based on impermissible hindsight; and,

g. The limitations of claims 3-6 are not taught by either Fujisawa or Shida in view of Abiko.

In response to Appellant's first argument, while Fujisawa indeed does teach against increasing Cr beyond 60 wt%, the presently claimed range is still close enough to the disclosure of Fujisawa that one of ordinary skill in the art would have expected them to have the same properties. See MPEP 2144.05. Appellant has not shown that unexpected properties are achieved compared to the range of the prior art. It is unclear if there really is an unexpected change in the properties of the alloy from 60 wt% to e.g.-60.01 wt%. While Appellant has demonstrated superior results of strength and

toughness compared to an alloy exemplary of the range of Fujisawa, the unexpected results are not demonstrated in a range commensurate in scope with the presently claimed range.

In response to Appellant's second argument, the present claims recite a composition "comprising" a list of elements, thus leaving the composition open to other elements, even in major amounts.

In response to Appellant's third argument, because the composition of Fujisawa is nearly identical to the presently claimed composition, and Appellant has not disclosed any special processing techniques required to achieve the balance of strength and ductility, one of ordinary skill in the art would have expected the alloy of Fujisawa to have the same properties.

In response to Appellant's fourth argument, firstly, while Appellant has characterized the rejection as relying on the alloy of Abiko, the rejection actually relies on the method, and in turn, the results of the method, of Abiko. Next, Shida teaches (see paragraph 8 of machine translation) that impurities, such as N and O, cause problems with the properties of the alloy and that they should be limited to a low amount. However, the only technology available to Shida for reducing the impurities was able to reduce the impurities to a level of about 1000-1500 ppm. However, not more than a year later, Abiko discovered a process of casting a metal, whereby greatly reduced amounts of impurities, such as C, N, O, S and P can be achieved, and that this reduction in impurities greatly improves workability of the alloy to be cast. The method of Abiko includes (see paragraph 19 and 21) "scull [sic] melting using the water-cooled

copper crucible" under a vacuum of no more than 10^{-6} torr. Compare this to the method disclosed by Appellant in the last paragraph on page 5. While Abiko teaches an Fe-Cr binary alloy where the Cr is limited to at most 60 wt%, the reason for limiting the Cr is purely economical. Thus, there is no actual technical reason given by Abiko that the process could not be applied to alloys with a Cr content above 60 wt%. In addition, there is no phase change in a binary Fe-Cr alloy in the neighbor of 60 wt% Cr (see attached graph), which would have led one of ordinary skill in the art to have assumed that there was a drastic change in crystal structure and/or texture that would have affected the process of Abiko. In addition, as can be seen in Appellant's statement of the background of the invention at the paragraph spanning pages 1 and 2 of the specification, it was known in the prior art that increasing the Cr content above 60 wt% was desired due to increased strength, but this had the problem of reduced workability. Thus, Shida corresponds to the high strength, but brittle alloy of the prior art, and Abiko provides a means for providing extra ductility to the alloy by a special casting method that limits the C, N, S and O impurities to very small amounts, which produces improved workability. In summation, while Abiko suggests limiting the Cr to 60 wt%, in the Examiner's opinion, it is not a direct teaching away, since the suggestion is merely for economic reasons, and there is a compelling reason in the prior art to increase the Cr above 60 wt%, that being to achieve greater strength.

In response to Appellant's fifth argument, firstly, the disclosure of Abiko merely suggests additional elements. Thus, these additional elements are not necessary. Secondly, even if the additional elements were required, the present claims recite a

composition "comprising" a list of elements, thus leaving the composition open to other elements, even in major amounts. Lastly, as stated above, the most important teaching of Abiko is actually the specialized casting method, which reduces the impurities in an alloy, not the composition taught by Abiko.

In response to Appellant's sixth argument, the Examiner contends that when presented with both Shida and Abiko, one of ordinary skill in the art would have arrived at the present invention because Shida teaches the base alloy composition, and Abiko provides the means to add workability to the alloy by a special casting method which reduces impurities. Thus, the rejection is only based on what was known to a person in art at the time of the invention.

In response to Appellant's seventh argument, Appellant has not disclosed that any additional special processing is required to achieve the claimed balance of strength and ductility. Thus, Fujisawa, which teaches a nearly identical composition, is close enough to the presently claimed composition that one of ordinary skill in the art would have expected it to have the same properties as claimed. Shida in view of Abiko teach a composition within the presently claimed range, thus, one of ordinary skill in the art would have expected it to have the same properties as claimed.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
December 23, 2003

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Conferees
Roy King
Robert Warden

APPEAL CONFEREE: Robert J. Warden, Sr.

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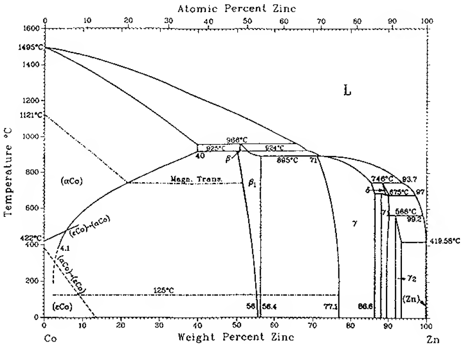
Co-Zn

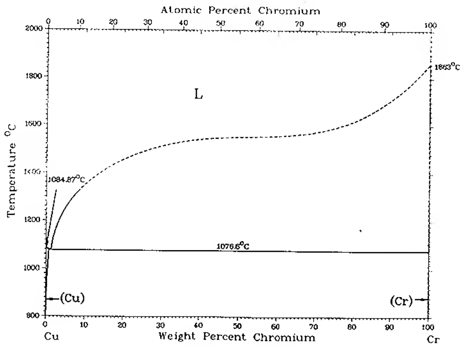
H. Okamoto, 1990



Phase	Composition, wt% Zn	Pearson symbol	Space group
(αCo)	0 to 40	cF4	$Fm\bar{3}m$
(εCo)	0 to ?	hP2	$P6_3/mmc$
β	~52 to 54	cI2?	$Im\bar{3}m$
$β_1$	50.5 to 59.0	cP20	$P4_132$
γ	71 to 86.6	cP52	$P\bar{4}3m$
$γ_1$	88.5 to 89.6	...	...
δ	~89 to <91	...	...
$γ_2$	92 to 93.5	mC28	$C2/m$
(Zn)	~100	hP2	$P6_3/mmc$

Cr-Cu

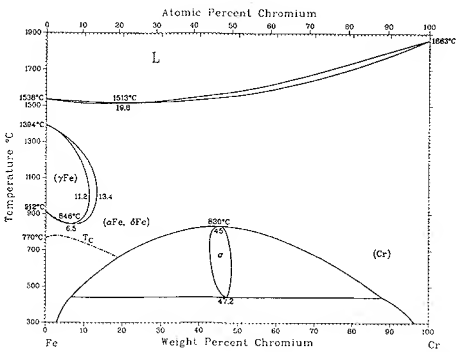
D.J. Chakrabarti and D.E Laughlin, 1984



Phase	Composition, wt% Cr	Pearson symbol	Space group
(Cu)	0 to 0.73	cF4	$Fm\bar{3}m$
(Cr)	99.8 to 100	cI2	$Im\bar{3}m$

Cr-Fe

H. Okamoto, 1990



Phase	Composition, wt% Cr	Pearson symbol	Space group
(αFe,Cr)	0 to 100	cI2	$Im\bar{3}m$
(γFe)	0 to 11.2	cF4	$Fm\bar{3}m$
σ	42.7 to 48.2	tP30	$P4_2/mnm$